

Defeating COVID-19 with “the hammer and the dance”

Why we need to buy time to rapidly increase health-care capacity and stand-up testing-and-tracing

22 March 2020

1. Introduction

The COVID-19 virus has infected nearly 312,000 people worldwide, and over 13,000 people have died.¹ Unfortunately, it appears that neither a vaccine nor a cure is likely to emerge soon – some scientists estimate that these are at least ~12-18 months away. As a result, it is quite possible that somewhere in the neighborhood of ~2 million Americans could die over the next year if no policy actions are taken.

Throughout Europe and North America, policy-makers have mainly adopted one of two approaches (or somewhere in between) in hopes of preventing such a dire outcome:

- **Indefinite severe social distancing** to flatten the curve: Attempting to slow the spread of the virus through various forms of social distancing, in order to prevent health-care systems from being overwhelmed, given limited existing healthcare capacity
- A **surgical approach** to protect the vulnerable and develop herd immunity: Attempting to isolate and protect vulnerable people, while allowing the rest of the population to go about their daily lives, until enough people have been infected and recovered to generate herd immunity

Unfortunately, both of these approaches are fatally flawed, as they are not politically sustainable over time. Both approaches would likely lead to a “epidemic yo-yo”² in which policy vacillates between the two approaches and leads to a “worst of both worlds” outcome with an overwhelmed health-care system, large numbers of deaths, significant economic hardship, and a collapse in government authority.

Instead, a third approach is needed: A two-phase strategy called “**the hammer and the dance**.”³ The first phase would last for several weeks and would entail fairly strict social distancing – the initial “hammer” to bring down on the virus. This temporary reprieve would provide the time needed to substantially increase the health-care system’s capacity, as well put in-place a program of widespread testing-and-tracing (which has been highly successful in several Asian countries). The second phase would see most

¹ <https://www.cbsnews.com/live-updates/coronavirus-disease-covid-19-latest-news-deaths-2020-03-22/>

² I borrowed the phrase “epidemic yoyo” from Tyler Cowen: <https://marginalrevolution.com/marginalrevolution/2020/03/herd-immunity-time-consistency-and-the-epidemic-yoyo.html>

³ I borrowed the phrase “the hammer and the dance” from Tomas Pueyo: <https://medium.com/@tomaspuoyo/coronavirus-the-hammer-and-the-dance-be9337092b56>

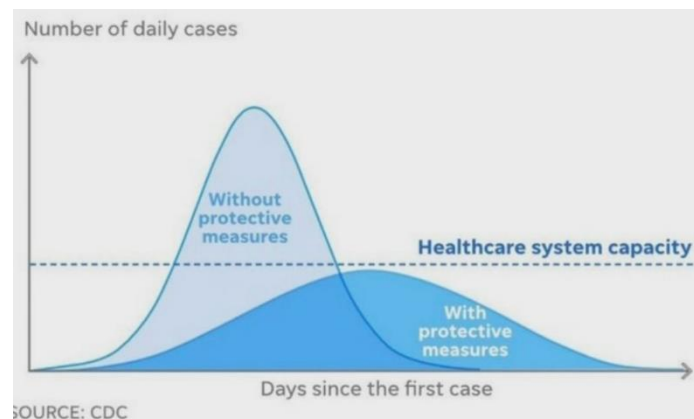
of the social distancing measures lifted, and testing-and-tracing maintained until a vaccine and/or a cure is found – the “dance” to keep the virus in-check. This approach would need to be complemented with steps to ameliorate the economic side-effects and pro-actively address political hurdles along the way.

While this third approach will not be easy, it is urgent for policy-makers to act now. Every day of delay reduces the chances of success and increases the probability of ending up in an “epidemic yo-yo” – with all of the associated negative outcomes.

2. Current approaches are unlikely to succeed

2.1 Attempts at “indefinite severe social distancing” are not sustainable over time

The logic behind attempting to “flatten the curve” is straightforward and can be easily understood via a common CDC graph (see below). Without social distancing, the virus would spread rapidly, causing a spike in cases that overwhelms the healthcare system’s capacity and leads to avoidable deaths. With social distancing, the virus will spread more slowly, and reduce the peak healthcare needs to a level within capacity. As a result, many governments (such as those in Italy, Spain, France, California, and New York) have adopted indefinite, fairly severe social distancing measures (essentially, asking most of the population to remain at home indefinitely), in order to keep the peak case-load below the healthcare system’s existing capacity.



While this common CDC graph may be conceptually correct, it is highly misleading in terms of guiding a policy response. In this case, the numbers to dimensionalize the issues are extremely important. At this point, our best estimates for the US likely come from an Imperial College paper that has received significant publicity.⁴ The key graph for the US is shown below. There are a few points to note:

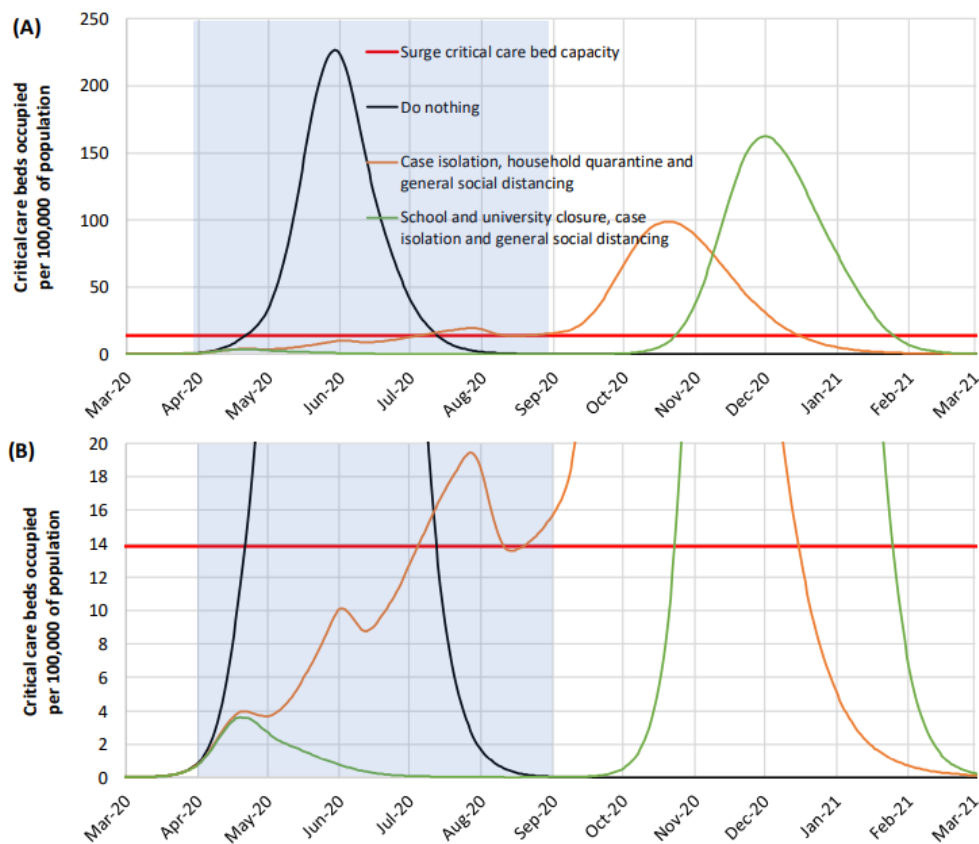
- If there were no public policy response and no “social distancing”, then the ICU bed requirements from COVID-19 (the black line) would outstrip the healthcare system’s capacity (the red line) by a factor of ~15x, not the 2-3x that the CDC graph would seem to imply. In this case, ~80% of the American population would be infected

⁴ Neil M Ferguson et. al. “Impact of non-pharmaceutical interventions to reduce COVID-19 mortality and healthcare demand”, 16 March 2020

throughout the course of the pandemic, and approximately 2.2 million Americans would die from COVID-19.

- The authors also consider two combinations of various social distancing policies such as school and workplace closures, household quarantines, and isolation of infected individuals. Moreover, they assume that these social distancing measures remain in place for 5 months, from late March to late August. Even with these extreme extended social distancing measures, the ICU bed requirements (the orange and green lines) outstrip the healthcare system's capacity (red line) by a factor of ~7-11x. Approximately 1.1-1.5 million Americans would die.⁵

Figure A1: Suppression strategy scenarios for US showing ICU bed requirements. The black line shows the unmitigated epidemic. Green shows a suppression strategy incorporating closure of schools and universities, case isolation and population-wide social distancing beginning in late March 2020. The orange line shows a containment strategy incorporating case isolation, household quarantine and population-wide social distancing. The red line is the estimated surge ICU bed capacity in GB. The blue shading shows the 5-month period in which these interventions are assumed to remain in place. (B) shows the same data as in panel (A) but zoomed in on the lower levels of the graph.



⁵ These death figures are an interpolation from Kevin Drum: <https://www.motherjones.com/kevin-drum/2020/03/heres-the-punch-in-the-gut-version-of-the-imperial-college-coronavirus-study/>

The upshot is clear: Locking up all Americans at home⁶ for 5 months, without any actions to increase the healthcare system's capacity or stand-up testing-and-tracing, would merely delay the point at which the healthcare system is completely overwhelmed (and somewhat moderately reduce the severity of the problem, albeit to a still catastrophic level), not prevent it. Put differently, a strategy of "indefinite extreme social distancing" would, by itself, likely require locking up all Americans at home for the full ~12-18 months until a vaccine and/or cure is found.

Needless to say, keeping people at home for even a few months would entail enormous social costs. There will be substantial economic hardships – in particular, lost income for many people who cannot work from home, and cascades of business bankruptcies that would severely cripple the economy's ability to recover once the crisis is over. Moreover, it doesn't take long for people to simply go stir-crazy.

As a result, this strategy is completely politically infeasible over any extended period of time. As the social costs mount from locking people up at home, compliance rates will plummet in a matter of weeks or months. In Wuhan, even people who were individually quarantined because they were sick got stir-crazy, and would often tend to leave after a few days to stretch their legs, go shopping, etc. So the Chinese government basically had to lock these people up using coercion, not merely voluntary compliance. And that's people who knew that they were sick. Good luck trying to get a large majority of ~330 million Americans (most of whom think they are healthy) to stay home voluntarily for months on end, with no end in sight.

The consequences of trying and failing at this approach are severe. As compliance with "remain home" orders plummets, this will be a clear sign of collapsing trust in government and dwindling obedience to public authority. This will severely limit federal, state, and local governments' abilities to respond to the current or future crises.

2.2 A "surgical approach to protect the vulnerable" will create a public backlash

There is also a second, less common, approach being discussed and implemented in the Europe and North America.⁷ This approach begins from the fact that, while a small subset of the population (e.g., the elderly, those with underlying health conditions) is particularly vulnerable to the effects of COVID-19, for most of the rest of the population the consequences of being infected with COVID-19 aren't particularly severe. As a result, the strategy is to segment the population into two groups. The government would isolate, protect, and prioritize medical resources to the vulnerable subset of the population, and let everyone else go about their normal lives. Once a sufficient number of people has been infected and recovered to generate herd immunity, the government would then let the two groups mingle again. As far as I can tell, this is currently the strategy in the Netherlands, and was in the UK until last week.

⁶ Obviously, this phrase is somewhat of an exaggeration. What I mean by it is the kind of measures currently being implemented in California and New York.

⁷ For example, David L. Katz "Is our fight against coronavirus worse than the disease?", NY Times, 20 March 2020

The argument in favor of this “surgical approach” is straightforward: With “indefinite severe social distancing to flatten the curve,” the cure is worse than the disease. One to two million deaths in the US would be a tragedy, but not a catastrophe, and hopefully the “surgical approach” to protecting the vulnerable would dramatically reduce the number of deaths. However, the economic, social, and political collapse associated with “indefinite severe social distancing” would be a catastrophe.

However, this “surgical approach” is almost certainly completely politically unsustainable, as it seems unlikely that the public would be willing to stomach such an approach. As the virus spreads rapidly and the death toll mounts, there would be increasing pressure that the government “do something.” Moreover, the attempt to gain herd immunity could fail. As of yet, it is not entirely clear how quickly the COVID-19 virus mutates, and thus it cannot yet be taken for granted that being infected once gives immunity indefinitely in the future.

2.3 Both current approaches may lead to an “epidemic yo-yo”

At its root, both of these current approaches face issues of time-consistency: We are not politically capable of holding the course with either approach. On the one hand, trying to “lock everyone up at home indefinitely” risks causing economic hardship and a collapse in obedience of public authority, leading people to leave their homes and resume their normal lives. Currently, countries such as Italy, Spain, and France are attempting this approach; time will tell how long the general public continues to cooperate. On the other hand, trying to adopt the “surgical approach” will invite public backlash – witness the UK government’s about-turn this last week. So we risk ending up with an “epidemic yo-yo” as policy alternates back-and-forth in its degree of social distancing for the population. This yo-yo risks giving us the worst of both worlds: Widespread pandemic with overwhelmed health systems, economic hardship, and destroyed public authority.

3. A strategy of “the hammer and the dance” is our best option

As an alternative, I would propose a third approach: Buying time to rapidly increase health-care capacity and stand-up a universal testing-and-tracing program. This approach has two phases:

- I. **The hammer:** For a period of 3-7 weeks, enact fairly strict social distancing measures (e.g., order most of the population to remain at home). Use this time to radically increase the capacity of the healthcare system, as well as to implement the infrastructure needed to support a universal and long-lasting testing-and-tracing program.
- II. **The dance:** Scale back the most severe social distancing measures (e.g., allow nearly everyone to go back to work), but maintain some less-restrictive social distancing measures (e.g., travel restrictions, bans on large gatherings). Maintain increased healthcare system capacity as well as universal testing-and-tracing, and continually adjust the degree of social distancing as needed, until a vaccine and/or a cure is found.

The period of time for the “hammer phase” would need to balance several considerations. On the one hand, it would need to be long enough to substantially reduce new case volumes to a manageable level, and to increase the capacity of the healthcare system and stand-up testing-and-tracing. On the other hand, it would need to be short enough to be able ameliorate the social costs and maintain high levels of voluntary compliance.

3.1. We need to rapidly stand-up a universal test-and-trace program

South Korea, Singapore, Taiwan, and Japan have all been relatively successful in limiting their number of cases, all without significant lock-downs of the entire population. A key ingredient of their success has been their test-and-trace programs. The essence of such a program is simple: Begin with widespread testing. Individually quarantine those who test positive, identify all of their contacts since they became infected, and isolate those contacts for a period of ~2 weeks. In particular, given that a large fraction of infections happen between family members, it is imperative that infected individuals be quarantined individually and separately from their family members, not in the same home as their family.

Rapidly standing-up such a test-and-trace program will require two things. First, there needs to be a rapid scale-up of both the number and speed of the tests available. Second, substantial numbers of personnel will be required to do the “shoe-leather” work of contact tracing.

3.2. We need to rapidly increase the healthcare system’s capacity

There are numerous actions that federal, state, and local governments would need to take in order to increase the healthcare system’s capacity to manage cases:

- Create additional hospital capacity, and in particular additional ICU capacity: e.g., convert stadiums into temporary hospitals, bring Navy medical ships to urban areas, set up MASH-type temporary hospitals, etc.
- Manufacture additional needed equipment, in particular ventilators and personal protective equipment (e.g., N-95 masks, eye protection, gloves, etc.)
- Increase the number of medical professionals who are able to treat patients: e.g., bring recently retired doctors and nurses back to work; expand the number of tasks that nurses, PAs, navy corpsmen, etc. are allowed to do; roll back regulations that restrict geographic mobility of medical professionals; allow medical students and residents to do additional tasks earlier; etc.

3.3. Economic policy can support “buying time”

“The hammer and the dance” strategy will also create economic hardships similar to those from the “indefinite severe social distancing” approach, albeit for a shorter duration of time. Fortunately, many of the economic policies needed to ameliorate these economic hardships are already being discussed and adopted in Washington, D.C. and in state capitals:

- Congress and state governments should provide temporary additional social assistance to potentially cash-strapped households through methods such as:
 - Direct cash transfers
 - Expanded and loosened unemployment insurance
 - Allowing penalty-free withdrawals from individual retirement accounts
 - Subsidizing COBRA health insurance premiums (to allow continuation of health insurance coverage for laid off or furloughed workers)
- The Fed needs to fulfil its role as the lender of last resort and provide additional US dollar liquidity to central banks around the world. If the Fed feels current legislation (e.g., Dodd-Frank) prevents it from fulfilling either or both of these duties, Congress should change the relevant legislation quickly.
- Congress and state governments may need to support particular businesses (e.g., through guaranteed loans) in order to prevent particular bankruptcies that entail greater social or economic costs.

The last point around supporting businesses is the most fraught. Governments cannot, and should not, subsidize all industries. Policy-makers need to clearly prioritize by deciding which industries and businesses should:⁸

- Be kept up and running (e.g., food, health care)
- Contract rapidly but bounce back once the crisis has passed (e.g., education)
- Not be protected at all and we would be willing to see perish (e.g., cruise ships)

3.4 We need to proactively address potential political hurdles to this approach

Within the federal government, there may be substantial hurdles to adopting this strategy, both internally and externally. The White House will need to proactively address both sets of hurdles.

To start with the internal hurdles, the White House should start by appointing a “coronavirus czar” with authority overall over all relevant agencies. The goal is to coordinate actions amongst federal agencies, as well as to remove regulatory roadblocks to fighting the crisis. In good times, federal bureaucracies are inefficient and slow-moving behemoths; in a crisis, this is deadly. To pick just 3 recent examples:

- South Korea developed and approved a new COVID-19 test in one week, leading to widespread testing. In the US, the FDA dragged its feet on approving new COVID-19 tests for 5 weeks, before it was forced to relent under pressure. As a result, it is extremely difficult for most Americans even today to get a test.⁹

⁸ <https://marginalrevolution.com/marginalrevolution/2020/03/the-best-economic-plan-against-the-coronavirus.html>

⁹ <https://www.reuters.com/article/us-health-coronavirus-testing-specialrep/special-report-how-korea-trounced-u-s-in-race-to-test-people-for-coronavirus-idUSKBN2153BW>

- Businesses that want create new production facilities for N-95 masks in the US are reporting that the National Institute for Safety and Health has informed them that “approval for a new mask production facility in the US will take at minimum 45 days, but more likely 90.”¹⁰
- When the White House considered issuing an executive order to speed the time to begin Phase 1 testing for drugs and other medical therapies for coronavirus, it met strong objections from FDA senior scientists who warned that changing their processes would pose risks to patients.¹¹

In order to meet these objectives, the czar would need substantial authority to dictate changes and priorities to agencies, up to and including authority to sideline recalcitrant bureaucrats and make “battlefield promotions.” The czar should also prioritize top-to-bottom cultural change in problematic agencies, beginning with changes to non-monetary rewards and recognition. For example, this czar should immediately discontinue the FDA’s annual Frances Kelsey award (which incentivizes rejecting a drug or device with potentially negative side-effects)¹² and create new awards for the employees who approve the first successful treatments and vaccines for COVID-19.

The White House will also need to appoint a point-person responsible for overcoming and countering external hurdles. The first priority should be to create and broadcast consistent messaging to the general public that transparently and truthfully articulates the strategy and its rationale. The second priority should be to manage external stakeholders who could potentially threaten this messaging. For example, it is possible that the AMA may be opposed to many of the actions needed to scale up the capacity of available medical personnel – it is possible to imagine AMA messaging along the lines of “having non-doctors do doctors’ work risks patient safety.”

4. Conclusion

Clearly, over the coming weeks and months, governments will also need to prioritize efforts to find a longer-term solution to the COVID-19 challenge (for example, by creating prizes for the people or organizations that first discover a vaccine and/or a cure). Moreover, some of the components of “the hammer and the dance” strategy (particularly the economic components) may cause longer-term problems that will need to be addressed at a later date – as Milton Friedman once noted, “there is nothing so permanent as a temporary government program.”

However, over the next few days, dealing with the near-term crisis needs to be the top priority. A new strategy – bringing down a temporary “hammer” on the virus, followed by a longer-term “dance” to keep it in-check – offers the best chance of savings lives and preventing avoidable social costs. Governments should act without delay.

¹⁰ <https://marginalrevolution.com/marginalrevolution/2020/03/niosh-national-institute-for-safety-and-health.html>

¹¹ <https://www.wsj.com/articles/trump-sought-to-expand-virus-drug-tests-over-fda-objections-11584545251>

¹² <https://marginalrevolution.com/marginalrevolution/2017/01/frances-kelsey-syndrome.html>